November 1981 Vol. VI No. 11

ENDANGERED SPECIES

Technical Bulletin Department of interior. U.S. Fish and Wildlife Service
Endangered Species Program, Washington, D.C. 20240

# Service Approves Two More Recovery Plans—Okaloosa Darter/ St. Croix Population Of Leatherback Turtle

On October 23, 1981, the Service's Director approved recovery plans for the St. Croix population of the leatherback sea turtle (*Dermochelys coriacea*) and the Okaloosa darter (*Etheostoma okaloosae),* bringing the total of approved final plans to 44. The Service anticipates the completion of at least 40 more plans during fiscal year 1982.

**Leatherback Turtle**

The recovery plan for the leatherback turtle focuses on the nesting population of leatherback turtles of St. Croix, Virgin Islands, the only portion of the species' habitat under United States' management. The scope of the plan is further limited, addressing the needs of the species while on land only. (A memorandum of understanding between the U.S. Fish and Wildlife Service (FWS) and Commerce's National Marine Fisheries Service (NMFS) gives jurisdiction over sea turtles to FWS when they are on land and to NMFS while they are at sea.)

The main objective of the recovery plan is to maintain and increase the St. Croix population of the leatherback by protecting the turtles and their nesting habitat. The first critical step called for in the plan is the protection of the Sandy Point beach site. Sandy Point, which has an estimated 95 nests per year, includes more nesting habitat than the other St. Croix beaches combined. The plan recommends acquisition of this site as a wildlife refuge.

Photo by M.F. Mettee

*Habitat deterioration and loss threaten the Okaloosa darter.*

Photo by National Marine Fisheries Service

*A leatherback turtle on Sandy Point beach, St. Croix, Virgin Islands.*

The greatest threat to the St. Croix population is the development of Sandy

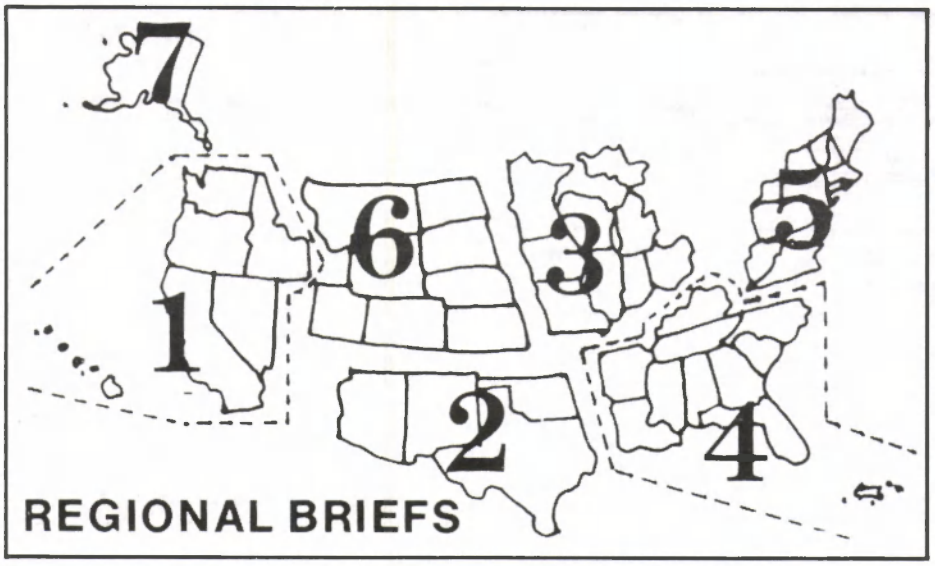
*Continued on page 3*

## Permit Office Schedules Wildlife Regulation Workshops

The Service's Federal Wildlife Permit Office (WPO) wishes to notify the public that it intends to conduct three 2-day workshops during January 1982. The first will be in Los Angeles on January 14-15, the second in Miami on January 19-20, and the third in New York on January 26-27. A consolidated 1-day session will be held in Washington, D.C. on January 7. Times and locations of the workshops will be announced later.

The purpose of the workshops will be to acquaint members of the business community who are affected by wildlife permit requirements with the regulatory sources, and to assist them in complying with wildlife regulations which are administered by WPO. There will be ample opportunity for discussions, comments and suggestions will be sought from the business community regarding the permit process itself.

Each workshop will be conducted by a team of WPO staff members. The first day of the workshop will be for the public and the second day will be for State and Federal government personnel. A fee of $25.00 per person will be charged for the public sessions of the workshop. (The authority for this charge is found in Section 11 of the Endangered Species Act of 1973, as amended.)




# REGIONAL BRIEFS

**Endangered Species Program regional staffers have reported the following activities for the month of October:**

***Region 1***—A Memorandum of Understanding (MOU) has been initiated between the Fish and Wildlife Service and the Department of Energy to promote the conservation of Beatley's milkvetch (*Astragalus beatleyae*). The only known remaining colony of this plant is on the Nevada Test Site. Two or three additional MOU's are being planned to assist with the conservation of other endangered species in Region 1.

**Region 2**—Jack Woody, Endangered Species Specialist, represented the Service regarding endangered species projects at the annual meeting of the U.S.-Mexico Joint Committee on wildlife conservation in Caliacan, Mexico, October 7–11. Thirteen endangered species sub-projects were approved.

A one year contract for a status survey on the ocelot (*Fells pardalis*) in south Texas was awarded to Dr. Daniel D. Everett, Texas A & I University, Kingsville. The purpose of the survey is to gather basic ecological information and to better define the degree of threat to the species.

The Wild Canid Survival and Research Center in St. Louis, Missouri, has become an active participant in the Service's red wolf (*Canis rufus*) recovery program. The Center, under the direction of Dr. Marlin Perkins, received its first pair of red wolves the week of October 19–23. They are being kept in a large secluded pen at the Center's wolf sanctuary. The Center will be conducting behavior studies on the wolves as well as attempting to breed the animals.

Over 200 peregrine falcons (*Faico peregrinus*) were trapped and banded on Padre Island along the Texas coast during their fall migrations as a part of the continuing migration and population studies.

The New Mexico Department of Game and Fish signed an MOU with the Service to cooperatively attempt to reestablish the razorback sucker (Xyrauchen texanus) in the San Juan River in northwestern New Mexico.

Twenty-six thousand eight hundred young bonytail chubs (*Gila elegans*) were stocked into Lake Mohave on October 19 in cooperation with the Arizona and Nevada Game and Fish Departments. This stocking was to supplement an existing, but tenuous population. This may be the only remaining pure population of the species in the world.

Service Special Agents apprehended an oil rig supply boat crew which had killed and butchered a loggerhead sea turtle (*Caretta caretta*) off the Texas coast. To date, two individuals have been fined $1,000 each and given a 6-month suspended jail term. The turtle was taken with a bow and arrow.

**Region 4**—Status surveys have been approved for the following species: Cahaba shiner (*Notropis* sp.), goldline darter (*Percina aurolineata*), amber darter (*Percina anteselia*), trispot darter (*Etheostoma trisella*), smoky madtom (*Noturus baileyi*), Alabama red-bellied turtle (*Pseudemys alabamensis*), Florida torreya (*Torreya taxifolia*), and Flori-

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**U.S. Fish and Wildlife Regions**

**Region 1:** California, Hawaii, Idaho, Nevada, Oregon, Washington, and Pacific Trust Territories. **Region 2:** Arizona, New Mexico, Oklahoma, and Texas. **Region 3:** Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico, and the Virgin Islands. **Region 5:** Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6:** Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7:** Alaska.

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da yew (*Taxus floridana*). A habitat survey has also been approved for the Florida sand scrub community in which 26 candidate species occur.

The Jacksonville Area Office was recently notified that a manatee radio transmitter found on the beach of Sanibel Island was brought to J.N. "Ding" Darling National Wildlife Refuge personnel. This is the first time that a lost manatee transmitter has been recovered.

The radioed manatee (No. 208m) was originally tagged in Magnolia Spring within Spring O'Paradise Canal, Crystal River, Citrus Country, Florida, on January 31, 1980; it left the tagging area on March 5, 1980. It is presumed that the manatee swam in the vicinity of Sanibel Island (over 200 miles from Magnolia Spring) where the transmitter was found. Researchers again observed it in the Crystal River area during the winter of 1980–81 without its transmitter. The transmitter was held by the Refuge until identified and then sent to Dr. Galen Rathbun, Denver Wildlife Research Center, Gainesville, Florida.

Manatee transmitters are encased in a padded collar fastened around the manatee peduncle (the narrow constriction anterior to the tail) by a buckle with corrodible pins designed to last approximately 1 year, the estimated life of the transmitter.

A leatherback sea turtle tagged on May 5, 1981, on Sandy Point, St. Croix, Virgin Islands was found dead September 11, 1981, on a beach at Atlantic City, New Jersey. It was one of 19 leatherbacks tagged at Sandy Point this year.

Merritt Island National Wildlife Refuge personnel have continued to observe and receive periodic reports of young loggerhead sea turtles (probably hatchlings of the year) being washed ashore in rafts of algae and seaweed during periods of high tides accompanied by strong easterly winds.

***Region 5***—West Virginia has been determined eligible to enter into a Cooperative Agreement under Section 6 of the Endangered Species Act of 1973. The State has been notified.

A survey of selected waterfalls in New York State for additional populations of the Chittenango ovate amber snail (*Succinea chittenangoensis*) was recently completed by recovery team leader Patricia Riexinger, New York State Department of Environmental Conservation, and a Region 5 representative. During the course of the survey, shells were collected and habitat parameters recorded. Identification of collected shells is underway.

This survey was a followup to the one planned and conducted by personnel of Region 5, New York State Department of Environmental Conservation, and others in August of this year on the Tennessee-North Carolina border (See Regional Briefs, September 1981 BULLETIN). Species collected on that survey appear almost certainly to be the Chittenango ovate amber snail.

All 21 eagles which were transplanted from Alaska in mid-July by the New York State Department of Environmental Conservation have successfully fledged. The eagles were held at Oak Orchard Wildlife Management Area in Genessee County, western New York. For earlier "briefs" on this project see the June and August 1981 issues of the BULLETIN.

***Regions 6 and 2***—The Canadian Wildlife Service, the U.S. Fish and Wildlife Service, and involved States are participating in a whooping crane (*Grus americana*) tracking program to determine what habitat is utilized by the migrating birds between Canada's Wood Buffalo National Park and Aransas National Wildlife Refuge in Texas. By means of radio transmitters which were attached to the three known chicks produced this year at Wood Buffalo, Canadian Wildlife Service and U.S. Fish and Wildlife Service air and ground crews are following the cranes. Detailed habitat analysis is being conducted wherever the birds land. The first chick to leave died after it flew into a power line in south central Canada. (This is the second whooping crane loss from crane/powerline collisions this year—an adult crane died from striking a powerline in Montana.) At the time of this writing, a second chick had been successfully tracked to northern Texas. Based on similar tracking studies done on sandhill cranes, it is believed that this study can dramatically advance our understanding of the biology of the whooping crane.

Overall, this has been an unusually poor year for the whooping crane. The three chicks which fledged at Wood Buffalo represent this year's total production. No chicks were produced at Grays Lake National Wildlife Refuge in Idaho. Severe drought appears to be the major cause of the Grays Lake nesting failures.

Wildfires have burned over 70% of the whooping crane nesting area at Wood Buffalo. It is too early to predict what the impact will be, if any, on next year's nesting success.

# WATS
# Western Atlantic Turtle Symposium—

A "Symposium on Sea Turtle Research of the Western Central Atlantic (Populations and Socio-Economics)" will be sponsored by the Intergovernmental Oceanographic Commission Association for the Caribbean and Adjacent Regions (IOCARIBE) in cooperation with the FAO/ UNDP Western Central Atlantic Fisheries Project (WECAF). It is scheduled for July 1983 in San José, Costa Rica. For further information contact: Dr. Robert R. Lankford, IOC Assistant Secretary for IOCARIBE, c/o UNDP, Apartado 4540 4540, San José, Costa Rica (Telephone: 24-92-94) or Mr. Frederick H. Berry, Secretary to the WATS, National Marine Fisheries Service, 75 Virginia Beach Drive, Miami, Florida 33149, U.S.A. (Telephone: 305/ 361-4276).

# OKALOOSA DARTER

*Continued from page 1*

Point beach. The area is zoned W-1 (Waterfront Pleasure), which allows residential dwellings, retail shops, restaurants, marinas and similar types of development. Presently the beach is a relatively isolated area with some swimming and fishing activity. Sand mining also occurs, but only above the dune line.

Since the mid-1970's, efforts have been made by the Virgin Island Bureau of Fish and Wildlife and Environmental Enforcement, the U.S. Fish and Wildlife Service, and the U.S. National Marine Fisheries Service to patrol the area of Sandy Point, count nests, tag turtles, rescue disoriented hatchlings, and apprehend persons found disturbing the animals and their nests. Unfortunately these efforts have been inconsistent from year to year. It is the intention of the Service, through implementation of the newly approved recovery plan, to develop a consistent recovery strategy and thereby guarantee the future of this population. Tagging programs, beach patrols, and relocation of nests threatened by beach erosion are recovery actions recommended by the plan.

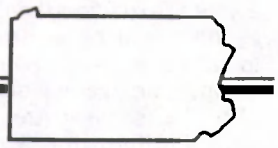
**Okaloosa Darter**

The Okaloosa Darter Recovery Plan was prepared by the Okaloosa Darter Recovery Team which includes members from Eglin Air Force Base, the Florida Game and Freshwater Fish Commission, the Alabama Geological Survey, the Florida State University and the U.S. Fish and Wildlife Service. The Okaloosa darter is endemic to six Choctawhatchee Bay tributaries in Okaloosa and Walton counties, northwest Florida.

Okaloosa darter habitat lies within approximately 113,000 acres of watershed. All but approximately 12,000 acres (which are privately owned) are within Eglin Air Force Base. The darter

*Continued on page 11*

## Pennsylvania State Report:



# Pennsylvania Species of Special Concern

The official responsibility for managing Pennsylvania's wildlife resources is shared by three separate State agencies, the Pennsylvania Game Commission (PGC), the Pennsylvania Fish Commission (PFC), and the Pennsylvania Department of Environmental Resources (DER). The PGC and PFC currently have responsibilities for the conservation of endangered wildlife within the various taxonomic groups which they manage. Pending legislation hopefully will soon give the DER responsibility for the management of endangered wild plants.

## The Game Commission

The PGC, which is responsible for the management of birds and mammals in the State, began its endangered species work in the summer of 1978—the beginning of nongame management, as such, for the agency. The first objective of the nongame project, which was coordinated by Michael J. Puglisi, was the development of State endangered bird and mammal lists. Dr. Frank Gill of the Academy of Natural Sciences formed and chaired a committee to develop a State endangered bird list. Dr. Hugh Genoways of the Carnegie Museum of Natural History did the same for State endangered mammals. During the two years that it took to develop these lists, several other projects were initiated.

### Indiana Bat Colony

During the winter of 1978–1979, PGC contracted with Dr. John A. Hall of Albright College to conduct a Statewide search for remaining colonies of the Indiana bat (*Myotis sodalis*). During November 1978, Dr. Hall visited a cave which he felt to be the most promising of bat habitats in the State, only to discover that it had been recently bulldozed shut. With the help of PGC and the U.S. Fish and Wildlife Service, the cave was reopened just before the onset of freezing weather. One year later, five Indiana bats were located in this cave; the following year (1980) 100–150 individuals were found there. This increased number, however, was still considerably fewer than the 1,000 bats which Dr. Hall estimated hibernated there in 1965. The cave was gated in 1979 in order to reduce human disturbance of the colony. Management of the bats includes a check of the hibernating population every second year.

### Bald Eagle Population

Perhaps the PGC's biggest success has been with its small resident population of bald eagles (*Haliaeetus leucocephalus*). When work on the bald eagle began in the spring of 1979, there were only three bald eagle nests in Pennsylvania and recent production had been quite poor—only six eaglets had been hatched from the three nests in the previous five years. As an initial effort, the PGC introduced a single eaglet to the nest of an unsuccessful pair—this was the only eagle to fledge in Pennsylvania in 1979.

Despite the poor production during 1979, nest monitoring had a valuable side benefit. Observations made during and after the 1979 nesting season, and an examination of past nesting success led PGC personnel to suspect human disturbance of the nests as contributive to reproductive failure. During the 1980 nesting season, therefore, nest disturbance was reduced as much as possible. Record production was the result. Four eaglets hatched (more than had been produced by three nests during any of the previous 20 years) and all three nests produced young (a first in 20 years of records). All four eaglets fledged.

A fourth nest was discovered during the 1981 nesting season and it, along with the other three nests, were pro-

Photo by J.E. Osman/Pennsylvania Game Commission

*Game Protectors, Dave Myers and Bob Lamadue, banding a nestling eagle.*

Photo by Paul G. Wiegman/Western Pennsylvania Conservancy

*The majority of bog turtle* (Clemmys muhlenbergi) *habitat in Pennsylvania is privately owned. Informal agreements to maintain suitable habitat have been made with owners of two recently discovered localities.*

tected from disturbance. The 1981 production matched that of 1980; four eaglets were produced from three of the four nests and a fifth eaglet was introduced to the unsuccessful nest. All five birds fledged. The record production during the 1980 and 1981 nesting seasons is a strong indication that the elimination of human disturbance has solved the bald eagle's biggest problem in Pennsylvania.

**Peregrine Falcon Releases**

Peregrine falcons (*Falco peregrinus*) were hacked from two Pennsylvania sites in 1976 and 1978 by the Peregrine Fund. Neither of the releases could be considered truly successful, however, and for three years activities were suspended by the Fund. After successes with northeastern coastal and urban peregrine hack sites, the Peregrine Fund returned to Pennsylvania in 1981. With the assistance of PGC and the Academy of Natural Sciences, the Fund set up a hack site on a prominent building in center-city Philadelphia from which four peregrines were fledged. An unidentified sub-adult female peregrine added some excitement to the event, appearing four days after the first young peregrine fledged and harassing the younger birds. Its aggressive behavior fortunately subsided without causing any serious problem—at least three of the four released birds successfully dispersed. The Fund and PGC may set up several gravel boxes near the hack site to encourage the sub-adult female to nest in the area next year.

**Osprey Hacking Program**

Results of a PGC questionnaire survey of its field personnel during 1978 indicated that there were approximately 100 summer resident ospreys (*Pandion haliaetus*) in Pennsylvania, including between 6–14 nesting pairs. Subsequent studies have revealed that, actually no ospreys nest in Pennsylvania but that they apparently move into the State during mid-April and remain throughout the summer. The presence of pairs of ospreys at a given site during spring and summer led to the mistaken, though reasonable, assumption that the birds were nesting. The realization that the osprey had been eliminated from Pennsylvania as a nesting bird led to the development of a pilot osprey hacking program developed by Charles Schaadt and Dr. Larry Ryman of East Stroudsburg, State College.

Initially, six 4-week-old ospreys (three from Maryland and three from Virginia) were hacked; all six birds fledged, though one was later lost to predation. Having had this success, a 5-year osprey hacking program was approved. The program is unique in that it is being funded jointly through the PGC's "Working Together for Wildlife" program (a program of fund raising through the sale of special patches and decals) and through contributions from State chapters of the National Audubon Society. Schaadt and Ryman propose to release 108 ospreys over a 6-year period and, hopefully, to reestablish the osprey in Pennsylvania. (The osprey is not protected by the Endangered Species Act of 1973).

PGC has also funded river otter (*Lutra canadensis*) research, conducted an aerial photo search for potential Delmarva fox squirrel (*Sciarus niger cinereus*) reintroduction sites and has investigated reported mountain lion (*Felis concolor*) sightings. The mountain lion work was conducted with considerable volunteer assistance from Hellen McGinnis, a wildlife biologist with background in both wildlife management and paleontology. Concrete evidence of mountain lions in the State has not yet been found. PGC has attempted to increase public involvement of and support for nongame wildlife work through news releases, various articles in periodicals and newspapers, radio and television interviews, and through public appearances.

# The Fish Commission

The Pennsylvania Legislature gave the PFC authority to manage the State's fish, amphibians, reptiles, and other "aquatic organisms" in 1974. Subsequently, matters relating to the conservation of endangered species within these taxonomic groups were assigned to various individuals until 1977 when Mr. Clark Shiffer was selected as Herpetology and Endangered Species Coordinator. Being in need of outside expertise and guidance, the PFC organized two formal advisory committees, a Herpetology Advisory Committee chaired by Dr. C. J. McCoy, and an Advisory Committee on Fishes. These two groups developed State lists of endangered fish, reptiles, and amphibians.

In 1979, the PFC embarked upon a 5-year endangered species plan. Initial accomplishments called for by the plan include the development of a manuscript by Dr. McCoy, under contract to PFC, which collates all available data on Pennsylvania s endangered reptiles and amphibians. This data will be published in early 1982 as a "Distributional and Bibliographic Inventory of Amphibians and Reptiles in Pennsylvania." Another aspect of the 5-year plan called for species surveys and habitat evaluation. Studies on two State-listed species, the bog turtle (*Clemmys muhlenburgi*) and the green salamander (*Aneides aeneus*), were conducted by Mr. Shiffer.

Fifteen historic bog turtle sites were visited and, although no turtles were seen, all but two sites appeared suitable for the occurrence of this species. Bog turtles were found at two out of four additional sites which Shiffer also visited; the other two sites appeared suitable for the species. Since the majority of historic and new locations for this species are on private land, landowner cooperation is essential for the maintenance of suitable habitat conditions. Discussions with landowners at the two new localities resulted in informal agreements to maintain the habitats in a condition necessary for the turtle's continued survival.

The only historic site in Pennsylvania for the green salamander was visited, but no individuals were found. A quarrying operation on the west slope of Wmp's Gap, Franklin County, where individuals of the species were last taken, may pose some threat to its existence. Moist rock with suitable crevices still exist, however. More thorough searching for the species in this area may reveal the presence of individuals. This site represents the northern-most occurrence of the species' range.

### Other State-Listed Species

Most historic localities of the redbellied turtle (*Chrysemys rubriventris*) are in the southeastern portion of the State. John Groves of the Philadelphia Zoo, who is also a member of the Herpetology Advisory Committee, has monitored the status of this species for some time and has confirmed its existence at the new localities recently reported by State law enforcement personnel.

Prior to the inception of the State's 5-year project, a study of the ecology and morphological variation of the massasauga (*Sistrurus catenatus*) had been done by Howard Reinert as a graduate degree project at Clarion State College. This work, as well as the special report on this small rattlesnake's historic and current distribution, which was coauthored by Dr. William Kodrich, also of Clarion State College, have been of immense importance to the State's understanding of the status and requirements of the species.

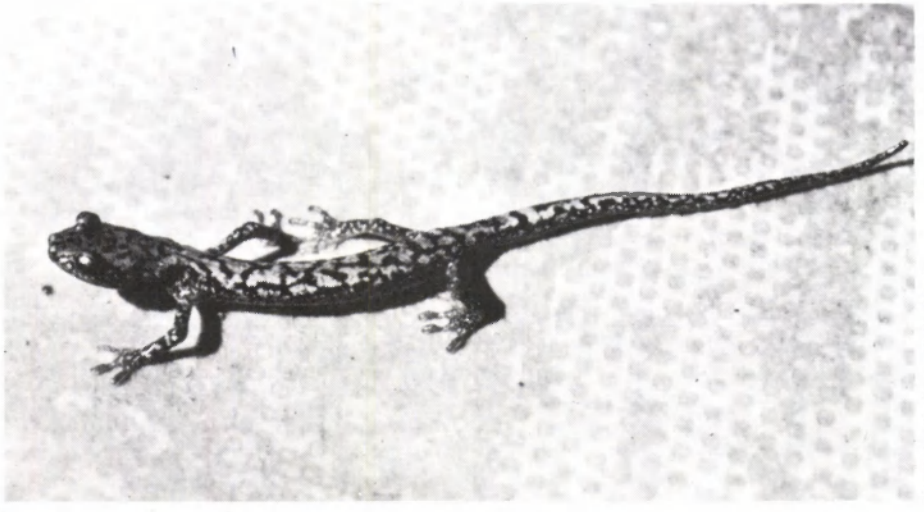


Photo by C. Kenneth Dodd, Jr.

*Suitable habitat for the green salamander remains at its single historic site in Pennsylvania. No individuals were seen there during a recent visit, however.*

Reinert is presently conducting a study of niche separation in the timber rattlesnake (*Crotalus horridus*) and the copperhead (*Agkistrodon contortrix mokeson*) at Hawk Mountain Sanctuary, Berks County, Pennsylvania. The PFC lists the timber rattlesnake as status indeterminate; Reinert's work will assist in making decisions concerning its management by the State.

PFC is currently contracting to obtain complete historical data on State fish. Additionally, it is increasing its public education efforts and is seeking additional funding through pending State legislation.

Pennsylvania was the first State to cooperate with the U.S. Fish and Wildlife Service in endangered species training programs. State law enforcement officers from both PGC and PFC participated in 3-day workshops conducted by the Service on various aspects of endangered species philosophy, identification and law enforcement activities. More workshops are planned for 1982.

# Pennsylvania's Plant Program

Pennsylvania presently does not have endangered plant legislation or an agency specifically responsible for plant protection . A bill entitled "The Wild Resource Conservation Act," which is currently being considered by the Pennsylvania Legislature, would place responsibility for endangered plants with the Department of Environmental Resources.

Since Pennsylvania did not have its own plant conservation authority, the Service contracted in 1978 with the Western Pennsylvania Conservancy, a private non-profit organization, to prepare an Endangered Plant Status Report for the State. Under the direction of Mr. Paul G. Wiegman, and with the assistance of professional botanists and interested amateurs, the Conservancy completed the report. It was published by the Service in early 1980.

The 1980 Plant Status Report prepared the foundations for a proposed list of State extirpated, endangered, threatened and vulnerable wild plants. The Conservancy continues to refine the proposed State plant lists and to review the present status of plants which it includes. Herbarium searches, field visits to recorded sites, and searches for new habitats and locations are being done through the Pennsylvania Natural Diversity Inventory (PNDI), a Conservancy project.

A primary purpose of the PNDI is to review the historic and present status of all species on the proposed State lists of plants and animals and to store the

pertinent data in a computerized system. Once the system is completed, individual species location, field status, and life history data will be available in an objective and timely format to public and private planners and resource managers. Assisting in the PNDI is the Pennsylvania Department of Environmental Resources, Bureau of Forestry, and Bureau of Environmental Master Planning.

**Habitat Acquisition/Preservation**

Western Pennsylvania Conservancy and other private conservation organizations have been active in the acquisition of both endangered plant and animal habitats throughout Pennsylvania. In 1979 the Western Pennsylvania Conservancy acquired a 100 acre tract of mature forest in Butler County containing a number of State listed plant species. The bald eagle nest site discovered in 1981 by the Game Commission, is on a tract of land acquired by the Western Pennsylvania Conservancy. The Nature Conservancy, Pennsylvania/New Jersey Field Office, is presently working to acquire a significant tract of serpentine barren vegetation in southeastern Pennsylvania which contains several endangered plants.

Through the Natural Areas Program of the State Forest System new areas are designed to protect plants. Alan Seegar Natural Area, Centre County, contains an outstanding display of Small's twayblade (*Listera smallii*), a proposed State endangered species. A recent find of mountain alder (*Alnus crispa*) in Bedford County will be protected by an extension of the existing Sweet Root Natural Area to include the location of the plants.

Photo by Paul G. Wiegman/Western Pennsylvania Conservancy

*The spreading globeflower* (Trollius laxus *ssp.* laxus) *is historically known from 14 sites in Pennsylvania; it is now extant at only two—Northampton County in the east and Lawrence County in the west. The Northampton site is one of the largest remaining colonies in northeastern U.S.. Both colonies of the species are being considered for protection by private conservation groups.* Trollius *is included in the Service's Notice of Review (F.R. 12/15/80) as a Category I species. One other State plant, the white-fringed prairie orchid* (Platanthera leucophaea) *is also listed under Category I. Seven plants are listed under the review's Category II. One State species, the small whorled pogonia* (Isotria medeoloides), *has been proposed as Endangered under the Endangered Species Act of 1973.*

# The Pennsylvania Biological Survey

The Pennsylvania Biological Survey, an umbrella group interested in all Pennsylvania flora and fauna, was formed in early 1979, at least partially, as a result of developing interest and work with the State's endangered wildlife and plants. It has as a main objective to promote the responsible and comprehensive management of all Pennsylvania's wild resources.

The Survey sponsored the first "Conference on Species of Special Concern—Threatened and Endangered Species of Pennsylvania" on March 7, 1981, at the Carnegie Museum of Natural History in Pittsburgh. The Survey includes representatives from the various State wildlife and natural resource agencies, private conservation groups, and the chairpersons of each of the endangered species committees mentioned in this story.

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*The information for this State feature was submitted to the BULLETIN staff by Mr. Michael Puglisi, the former Endangered Species Coordinator for PGC (Mr. Puglisi recently left PGC to engage in further academic study); Mr. Clark Shiffer, Herpetology and Endangered Species Coordinator for PFC; and Mr. Paul Wiegman, Director of the Natural Area Programs for the Western Pennsylvania Conservancy.*

## Reference Note

All Service notices and proposed and final rulemakings are published in the *Federal Register* in full detail. The parenthetical references given in the BULLETIN—for example: (F.R. 9/4/81)—identify the month, day, and year in which the relevant notice or rulemaking was published in the *Federal Register*

# Co-op Units Conducting Endangered Species Projects

*by Michael Bender*

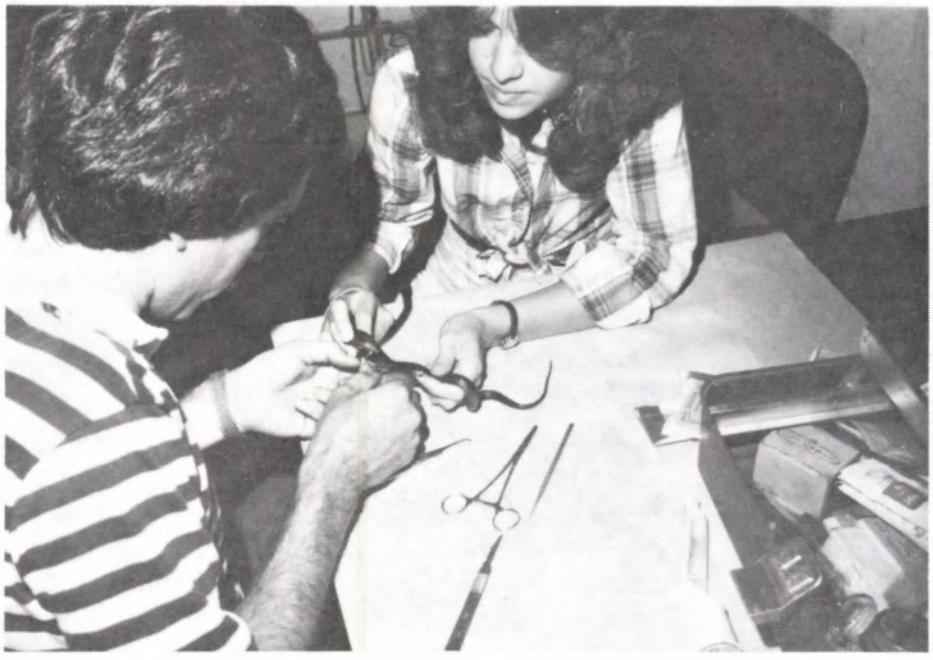

Photo by Dan Speake/Alabama Wildlife Co-op Unit

*Donna and Joseph McGlincy, researchers with the Alabama Wildlife Co-op Unit, suturing a transmitter incision in a juvenile Eastern indigo snake.*

Of the various Service programs assisting in Endangered species conservation, the Cooperative Research Units program is not one of the most visible. Yet individual units are doing important work on a number of listed animals, as well as other fish and wildlife species. During fiscal years 1979–81, units in 17 States conducted 35 projects on 25 Endangered and Threatened animals.

The co-op units program began in 1935 with an idea by J. N. (Ding) Darling, who recognized the inadequacy of existing wildlife research and training efforts. He helped set up the first Cooperative Wildlife Research Unit that year at Iowa State College, and soon other units were established at schools throughout the country. Their basic purpose was to enhance cooperation among the Federal Government, State agencies, universities, and private organizations on joint research projects and education. Currently, the program includes 26 fishery, 21 wildlife, and 3 combined units. The Office of Cooperative Units was established in 1979 to administer the program.

Service biologists conduct the business of each unit, with the direction of a coordinating committee made up of a representative from each cooperator. In addition to conducting research projects, units provide technical assistance for management, issue special reports, disseminate material already published, and organize training sessions.

### Eastern Indigo Snake Project

One example of the co-op projects on listed species is an ongoing study on the status of the Eastern indigo snake (*Drymarchon corais couperi*) in Georgia, which is being conducted by the Alabama Cooperative Wildlife Research Unit at Auburn University. Cooperators include the Auburn University Agricultural Experiment Station, the Game and Fish Division of the Alabama Department of Conservation and Natural Resources, the Wildlife Management Institute, and the Service.

Funding for various facets of the project has come from the Service, the Georgia Department of Natural Resources, Auburn University, and the National Wildlife Federation. The research has already yielded new data on the snake's ecology, its distribution within Georgia, its habitat requirements, and measures to promote its conservation.

One of the largest colubrid snakes in North America, the Eastern indigo may achieve lengths of over 8 feet. Its name is taken from the snake's smooth, irridescent body scales of a deep blue-black color. Although it was reported historically throughout the southeastern United States coastal plain, from South Carolina to Florida and west to southern Louisiana, only southeastern Georgia and peninsular Florida currently are believed to support sizeable populations. (Both States now give the snake full protection, and it is classified federally as a Threatened subspecies.) Among the purposes of the project, therefore, are to explore the various factors leading to the snake's decline and to delineate ways of promoting its recovery.

### Georgia Distribution Survey

Beginning in May 1978, Joan E. Diemer and Alabama co-op unit leader Dan W. Speake distributed two questionnaires to solicit current information on the distribution of the Eastern indigo snake in Georgia. One form was sent to herpetologists who would possibly have Georgia specimens or records, and to State wildlife biologists who might have knowledge of its occurrence. The second form added a description of the snake and an inquiry on the person's ability to correctly identify the subspecies; this version was sent to Soil Conservation Service personnel, conservation officers, and amateur naturalists within the snake's Georgia range. Both forms inquired about sightings and capture locations. Of 373 questionnaires distributed during the early months of the study, 182 were returned, and 62 persons furnished information on Eastern indigo sightings. The sightings were ranked by the investigators according to the likelihood of validity. An additional 111 references provided further records. Although there were differences in opinion according to locality, the consensus of the respondents was that the snake had indeed declined over the past 10 years.

Extensive field work, including follow-up interviews, was conducted from September 1978 through June 1980, yielding the additional references, additional sightings, and habitat information. Actual field time during some 40 trips to southern Georgia was divided among interviews, habitat surveys, and searching for the snake.

Overall, approximately 590 Eastern indigo snake sightings were reported during the course of the study, and 511 were judged to be reliable. Of the 94 coastal plain counties, 42 had valid sightings, with Coffee County leading at 56 individual references. Some of the data were historical; chronologically, the records span about 82 years.

Several of the study findings have a direct bearing on the snake's status.

Habitat surveys revealed that 88 percent of the 60 Eastern indigo sighting localities were xeric areas associated with deep, well drained sandy soils. According to Speake and Diemer, planted slash pine-scrub oak habitat provided most of the sightings, followed by the long-leaf pine-scrub oak type. Further, the study confirmed earlier data on the importance of gopher tortoise (*Gopherus polyphemus*) burrows on sand ridges as Eastern indigo snake refuges and essential overwintering sites. The fate of the two reptiles is increasingly being seen as having a direct and vital link.

### Radio Telemetry

Because of the secretive and sometimes subterranean habits of snakes, field study of these reptiles is often difficult. However, the use of radio telemetry in ecological research on a growing variety of animals offered promise for the Eastern indigo project. Between September 1976 and April 1979, Speake and Joseph McGlincy of the Wildlife Unit, and Thagard R. Colvin (of the Georgia Department of Natural Resources) released 39 marked indigos on a protected study area near Tifton, Georgia. Of these, 32 had been fitted with tiny radio transmitters so that their movements could be tracked to determine preferred habitat types.

After deciding that only internal transmitters would be practical, a number of different designs were made and field tested; seven snakes carried more than one instrument. Two different types were found acceptable for further use, both of which required surgical implantation. The first, with an average operating life of 52 days, featured a small external broadcasting antenna which had a range of approximately 805 meters with ground-based tracking equipment. The second type had a similar range, but carried a high accuracy thermistor to give a temperature correlation with the pulse rate.

Among the initial findings of the radio telemetry study was that the Eastern indigo exhibited wide variation in movements, some being sedentary and others traveling more than 3.2 kilometers from the release sites. Many of the longer movements were from one habitat type to another, suggesting a requirement for several types within the annual range. According to the investigators, areas managed for Eastern indigos should ideally consist of several thousand hectares to provide adequate year-round habitat. The snakes moved from smaller areas of sandhill habitat to the vicinity of agricultural fields and stream bottom thickets in summer. During late summer and fall, they generally moved extensively, seeking mates or winter dens. Inactive gopher tortoise burrows accounted for 67 percent of Eastern indigo dens during the study.

None of the snakes showed any serious ill effects from implantation of the transmitters. Research is continuing into development of yet more efficient instruments.

### Captive Propagation

The Alabama co-op unit is in the fourth year of a captive propagation and restocking effort on the Eastern indigo snake. About 40 adult snakes are being kept on hand as breeders, and for research on reproduction. Some problems have been encountered with egg fertility and fungus on incubating eggs, but research into techniques for improving success is being conducted by graduate student Donna McGiincy, technician Thomas Jones, and Speake.

Since 1977, more than 200 marked Eastern indigos have been released into nine protected study areas in Georgia, Florida, Alabama, and Mississippi. A number of the snakes have been recaptured for measuring growth rates. (Some were carrying radio transmitters.) Further captive propagation and monitoring of release area populations may continue under plans advanced for additional research on the snake.

### Preliminary Conclusions

After analysis of the data gathered so far, the investigators feel that the snake is maintaining viable populations in protected areas of suitable habitat. They believe, however, that some populations will decline in the future as real estate development, certain forestry practices, and agricultural conversion alter the vital sandhill habitat. Among their chief recommendations is that the habitat loss be mitigated through establishing sanctuaries to preserve portions of the sandhill and other ecosystem types. The feasibility of various other measures is being investigated, including burrow gassing restrictions, further captive propagation and restocking, and prescribed burning to increase plant diversity and maintain greater gopher tortoise densities. Continued legal protection is seen as essential, since the snake's large size, docile nature, and handsome coloration have made it vulnerable in the past to overcollection for the pet trade. The need for public education to foster greater awareness of the Eastern indigo's status, and to counter the widespread unpopularity of snakes in general, also is recognized as important.

### Recovery Plan

The Alabama Cooperative Wildlife Research Unit is currently preparing an Eastern Indigo Snake Recovery Plan for the Service. Unit leader Speake is the principal investigator, and is being assisted by Diemer and Joseph McGiincy.

* * * *

Other selected co-op projects will be featured periodically in future issues of the BULLETIN.

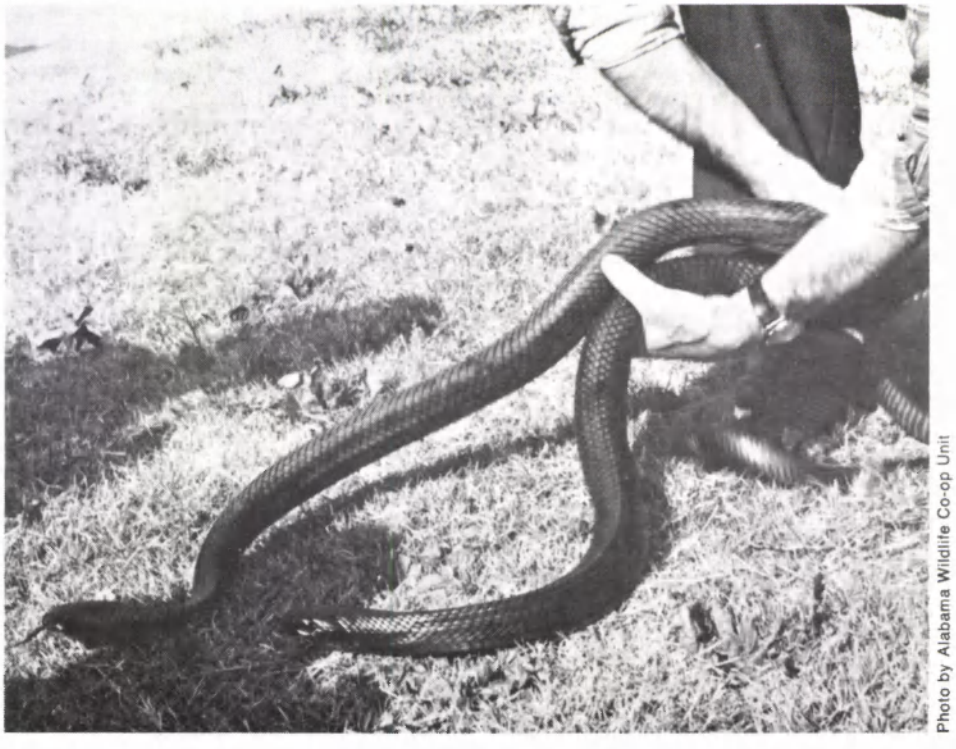

Photo by Alabama Wildlife Co-op Unit

*Two large male indigo snakes being handled by researchers.*

# CITES NEWS October 1981

*The Endangered Species Act of 1973, as amended in 1979, designates the Secretary of the Interior as both the Management Authority and the Scientific Authority of the United States, for the purposes of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Management Authority responsibilities are delegated to the Associate Director—Federal Assistance; Scientific Authority responsibilities are delegated to the Associate Director-Research.*

*The Service's Wildlife Permit Office (WPO) functions as staff to the U.S. Management Authority for CITES, assuring that wildlife and plants are exported or imported in compliance with laws for their protection and issuing permits for legal trade of these species. The Service's Office of the Scientific Authority (OSA) functions as staff to the U.S. Scientific Authority for CITES. OSA reviews applications to export and import species protected under CITES, reviews the status of wild animals and plants impacted by trade, makes certain findings concerning housing and care of protected specimens, and advises on trade controls.*

## Bobcat Findings Await District Court Approval

Final export findings for bobcat, lynx, river otter, Alaskan gray wolf, Alaskan brown bear, American alligator, and American ginseng taken in the 1981–82 season were published by the U.S. Scientific and Management Authorities for the CITES (F.R. 10/14/81). The State-by-State findings for bobcat export will be delayed for at least 60 days; the other findings are effective immediately.

Two years ago, Defenders of Wildlife, Inc. challenged the adequacy of criteria used by the Scientific Authority in advising whether export would not be detrimental to the survival of the species with regard to bobcat exports resulting from the 1979–80 harvest season. On February 3, 1981, the U.S. Court of Appeals for the District of Columbia Circuit held that the criteria (challenged by Defenders) are invalid. The court set aside the criteria to the extent that they are not based on reliable estimates of the bobcat population and data showing the total number of bobcats to be killed in each of the States involved.

The Court of Appeals remanded the case to the District Court for findings of fact and conclusions of law consistent with its opinion. On remand, with the agreement of both the Service and Defenders, the District Court dismissed the case as it pertained to export of bobcat taken during the previous seasons. The Court enjoined the Service from authorizing export of bobcat taken after July 1, 1981, until it developed guidelines consistent with the Court of Appeals decision and made findings based on the guidelines.

In compliance with the District Court injunction dated April 22, 1981, the Service's May 26, 1981, notice (the first notice pertaining to this year's export findings) announced a request for the States to submit data necessary to obtain reliable population estimates and data concerning the number of bobcats to be killed. Not regarding such data to be entirely sufficient for its findings, however, the Scientific Authority also requested other information necessary to satisfy its own original criteria.

Defenders did not view the Service's compliance as satisfactory and stated in formal response that the "Service failed to establish guidelines for the proposed Scientific Authority advice or to explain the methods used in formulating this advice." The Service, however, believes that the criteria discussed in the May 26, 1981, notice and specifications of types of information needed from States provide the guidelines required by the Appellate and District Courts.

During the 60-day delay of the effective date for bobcat export approval, the Service will seek vacation of the injunction issued by the District Court for the District of Columbia, since it believes that data submitted by the States, as well as that collected by the Service, fully support its export findings. (See the June 1981 BULLETIN for more information).

**Export Approval**

The Service approved the issuance of export permits for certain Appendix II species lawfully taken during the 1981–82 season in the following States and Indian territories, on the grounds that both Scientific Authority and Management Authority criteria have been met:

Bobcat—Alabama, Arizona, Arkansas, California, Colorado, Florida, Georgia, Idaho, Kansas, Louisiana, Maine, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Mexico, New York, North Carolina, Oklahoma, Oregon, South Carolina, Tennessee, Utah, Texas, Vermont, Virginia, Washington, West Virginia, Wisconsin, Wyoming, Klamath Tribe, Navajo Nation.

Lynx—Alaska, Idaho, Minnesota, Montana, Washington.

River Otter—Alabama, Alaska, Arizona, Connecticut, Delaware, Florida, Georgia, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Montana, New Hampshire, New York, North Carolina, Oregon, South Carolina, Vermont, Virginia, Washington, Wisconsin.

Alaskan gray wolf—Alaska.

Alaskan brown bear—Alaska.

American alligator—Florida and Louisiana.

American ginseng—Arkansas, Georgia, Illinois, Indiana, Iowa, Kentucky, Maryland, Minnesota, Missouri, North Carolina, Ohio, Tennessee, Vermont (artificially propagated ginseng only), Virginia, West Virginia, and Wisconsin.

## ICAC Objects to Peregrine Permit

A letter from the International Convention Advisory Commission (ICAC) to the Secretary of the Department of the Interior dated May 27, 1981, objected to the Service's procedures in issuing a permit to the United Peregrine Society for the import of fledgling peregrine falcons (*Faico peregrinus anatum*) from Mexico. The Service's response to ICAC's objections was printed in the October 16, 1981, *Federal Register*.

ICAC's objections to the permit issuance are partially procedural, since the Commission would ordinarily be consulted in such cases. Other objections by ICAC involved biological concerns, all of which were thoroughly reviewed as important issues by the Service before issuing the permit.

An initial recommendation of OSA to deny the permit request was overruled by the Acting Deputy Director of the Service after consultation with other facets of the Service and with other biologists. According to the Service, the biological concerns raised by ICAC involved issues on which the scientific community holds divided views.

ICAC's letter of objection and the Service's response involve a very complex and technical set of biological questions. For more information, please consult the *Federal Register*. This is the only instance when the Department has needed to formally publish notice of a disagreement with an ICAC recommendation. This was done in order to comply with provisions of the Endangered Species Act of 1973, as amended.

# Culebra EIS Available

The Service announced the availability of a final environmental impact statement (FEIS) on the environmental and other effects of transferring certain lands declared excess by the U.S. Navy in the Culebra Island group of Puerto Rico (F.R. 10/13/81). This disposition will affect six species protected under the Endangered Species Act of 1973, as amended.

The FEIS evaluates impacts of six alternatives for disposing of and administering these lands, including several alternatives which would implement the recommendations of a Joint Report of October 1973, entitled "Culebra: A Plan for Conservation and Development." This Plan resulted from a 1971 resolution of the Senate Committee on Interior and Insular Affairs which directed the Secretary of the Interior, in consultation with the Commonwealth of Puerto Rico, to conduct a study and develop a plan for the best use of lands on Culebra and the adjacent keys.

The Joint Report Alternative would deed to the Commonwealth of Puerto Rico approximately 936 acres of excess Navy land on the island of Culebra and about 262 acres of National Wildlife Refuge lands on the island of Culebrita. It would also transfer to the Service approximately 776 acres of land on Culebra. For those lands proposed for transfer to the Commonwealth, strict conveyance restrictions are included which are designed to protect the wildlife related and cultural resources while allowing for the enhancement of local economic and social conditions.

The proposed action of the FEIS is similar to the Joint Report Alternative, except that Culebrita would be retained within the National Wildlife Refuge System. The wildlife related resources on Culebra would be protected while allowing for enhancement of local economic and social conditions.

It is significant to note that the proposed action of this FEIS is different from the proposed action of the draft EIS (the Joint Report Alternative). This change in position by the Service was based on an assessment of the comments on the draft statement which overwhelmingly favored retention of Culebrita Island in the National Wildlife Refuge System.

The FEIS evaluation standards, based on the Joint Report and other discussions, specify which alternatives best meet the needs of all interested parties. In general, the standards include maintaining and building on the political accords of the past, providing opportunity for economic benefits for Puerto Rico, and preserving the wildlife resource values (especially Endangered and Threatened species) of the Culebra Island group.

Listed species which will be affected by the disposition of the land in question are the Endangered brown pelican (*Pelecanus occidentalis*); Endangered Culebra Island giant anole (*Anolis rooseveiti*) for which the Mount Resaca area has been designated as Critical Habitat; and four species of marine turtles which either nest on Culebra and Culebrita or are found in the adjacent waters. The latter include Threatened loggerhead (*Caretta caretta*) and green (*Chelonia mydas*) turtles and Endangered leatherback (*Dermochelys coriacea*) and hawksbill (*Eretmochelys imbricata*) turtles. Critical Habitat has been proposed for Culebra, Culebrita, Cayo Norte, and Mona Island for the hawksbill (F.R. 10/22/80).

Written comments on the FEIS may be sent to Mr. Walter O. Steiglitz, Regional Director, U.S. Fish and Wildlife Service, 75 Spring Street, S.W., Atlanta, Georgia 30303. For further information contact Mr. Kenneth M. Butts, Chief Ascertainment Biologist, U.S. Fish and Wildlife Service, 75 Spring Street, S.W., Atlanta, Georgia 30303. Telephone (commercial) 404/221-3548; (FTS) 242-3548.

## OKALOOSA DARTER

*Continued from page 3*

may be found in areas of moderately fast current with water temperatures between 45° to 75°F and depths to about 5 feet along the 186 linear miles of stream habitat.

The Okaloosa darter was classified as Endangered in 1973 due to its limited range and the deterioration and loss of habitat. Recently, the brown darter has been found in increasing numbers within the range of the Okaloosa darter and may be displacing it in some areas.

The objective of the Okaloosa Darter Recovery Plan is to improve the species' status to the point that it may be reclassified from Endangered to Threatened and ultimately be removed from the U.S. List of Endangered and Threatened Wildlife and Plants. To reach this objective the plan identifies three primary strategies: (1) determine biological characteristics and habitat requirements; (2) protect extant populations and habitats; and (3) increase population sizes and reestablish the species throughout its former range.

Among the highest priority tasks to prevent the species' extinction are: (1) gaining an understanding of the extent of competition between the Okaloosa darter and brown darter and monitoring the sympatric populations; (2) monitoring of habitat changes and evaluating activities which might alter the darter habitat; and (3) determining biological characteristics of the darter populations and physical parameters of the habitat. Determination of darter distribution within its range has been completed.

The plan recommends that a management plan be developed for Eglin Air Force Base as soon as sufficient information is available. The plan also suggests habitat improvement, management to reduce competitors and predators, and additional population dynamics studies, including extended population monitoring and periodic sampling.

Implementation of the recovery tasks for both plans will be initiated by the Service's Atlanta Regional Director and carried out through the Atlanta Regional Endangered Species Office. Further information can be obtained by contacting the Regional Director, U.S. Fish and Wildlife Service, 75 Spring Street, S.W., Atlanta, Georgia 30303 (404/221-3583).

# NEW PUBLICATIONS

The first supplement to the *Inventory of Rare and Endangered Vascular Plants of California*, Special Publication No. 1 (2nd Edition), edited by James Payne Smith, Jr., was published by the California Native Plant Society (CNPS) in April 1981. It is available for $3.00, tax and postage included, from CNPS, 2380 Ellsworth, Suite D, Berkeley, California 94704.

Wildlife Monograph No. 77 (Supplement to *The Journal of Wildlife Management*, Vol. 45, No. 3, July 1981), "Deer Social Organization and Wolf Predation in Northeastern Minnesota," by Michael E. Nelson and L. David Mech was published by the Wildlife Society. Copies are available for $2.70 from the Wildlife Society, 5410 Grosvenor Lane, Bethesda, Maryland 20814.

An *International Register of Specialists and Current Research in Plant Systematics*, 1981, compiled and edited by Robert W. Kiger, T. D. Jacobsen, and

## Attention Readers

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—The Editor

## BOX SCORE OF SPECIES LISTINGS

| Category | ENDANGERED U.S. Only | ENDANGERED U.S. & Foreign | ENDANGERED Foreign Only | THREATENED U.S. Only | THREATENED U.S. & Foreign | THREATENED Foreign Only | SPECIES * TOTAL |
|---|---|---|---|---|---|---|---|
| Mammals | 15 | 17 | 224 | 3 | 0 | 21 | 280 |
| Birds | 52 | 14 | 144 | 3 | 0 | 0 | 213 |
| Reptiles | 7 | 6 | 55 | 8 | 4 | 0 | 80 |
| Amphibians | 5 | 0 | 8 | 3 | 0 | 0 | 16 |
| Fishes | 29 | 4 | 11 | 12 | 0 | 0 | 56 |
| Snails | 3 | 0 | 1 | 5 | 0 | 0 | 9 |
| Clams | 23 | 0 | 2 | 0 | 0 | 0 | 25 |
| Crustaceans | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Insects | 7 | 0 | 0 | 4 | 2 | 0 | 13 |
| Plants | 51 | 2 | 0 | 7 | 1 | 2 | 63 |
| TOTAL | 193 | 43 | 445 | 45 | 7 | 23 | 756 |

*Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, American alligator, green sea turtle, and Olive ridley sea turtle.

Number of species currently proposed: 11 animals
9 plants
Number of Critical Habitats listed: 50
Number of Recovery Teams appointed: 68
Number of Recovery Plans approved: 44
Number of Cooperative Agreements signed with States:
38 fish & wildlife
11 plants

October 31, 1981

## NEW PUBLICATIONS

*Continued from page 11*

Roberta M. Lilly was published by the Hunt Institute for Botanical Documentation. Copies are available for $10.00 (prepaid) from the Hunt Institute at the Carnegie-Mellon University in Pittsburgh, Pennsylvania 15213. This publication is based on data from over 1500 questionnaires returned between November 1978 and December 1980. The Institute plans to continue this Register as an ongoing project, with triennial resolicitation of data and publication of updated printed editions.

*U.S. Exports and Imports of Cacti, 1977–1979*, August 1981, prepared from U.S. Fish and Wildlife Service data by Linda McMahon, Ph.D. for the International Convention Advisory Commission (ICAC) is now available. A second publication, a reference list of the Appendices to the Convention on International Trade in Endangered Species of Wild Fauna and Flora, *The Appendices Arranged in Taxonomic Sequence and Alphabetically by Common and Scientific Names*, compiled by the staff of ICAC is also available. Copies of both publications may be requested from Mr. Thomas McIntyre, International Convention Advisory Commission, Chairman, Room 713, FB–1, 6505 Belcrest Road, Hyattsville, Maryland 20782.

The 1981 Supplement to *A Bibliography of Endangered and Threatened Amphibians and Reptiles in the United States and its Territories (Conservation, Distribution, Natural History, Status)* by C. Kenneth Dodd, Jr. is now available from the Smithsonian Herpetological Information Service as publication No. 49. The original bibliography, publication No. 46 (1979) and the recent supplement may be requested from the Division of Reptiles and Amphibians, Smithsonian Institution—USNM, Washington, D.C. 20560.

Three INFORMATION PACKETS—on whales, seals, and sea turtles—are now available from the Center for Environmental Education. The packets include general introductions to the species (14 whales, 7 sea turtles, and 14 seals); black and white drawings of each animal; data on range, habits, size and weight, and population status; surprising facts about each animal; background material on evolution, anatomy, and general characteristics; and suggestions on what you can do to help protect these animals. All three packets (48 sheets) may be purchased for $6.25 plus $1.50 postage and handling; individual packets (please specify) cost $2.50 each, plus $.85 postage and handling. Send order to Center for Environmental Education, 624 9th Street, N.W., Washington, D.C. 20001 (202/737–3600).

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ENDANGERED SPECIES

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